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SEQUENCE LISTING

<110> Koichiro KAKU, et al.

<120> GENE CODING FOR ACETOLACTATE SYNTHASE

<130> 1254-0259PUS1

<140> US 10/509,121

<141> 2004-09-28

<150> JP 2002-95721

<151> 2002-03-29

<160> 39

<170> PatentIn Ver. 2.0

<210> 1

<211> 2301

<212> DNA

<213> Oryza sativa var. kinmaze

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Met Ala Thr
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acc gcc gcg gcc gcg gcc gcc gcc ctg tcc gcc gcc gcg acg gcc aag 104
Thr Ala Ala Ala Ala Ala Ala Ala Leu Ser Ala Ala Ala Thr Ala Lys
5 10 15

acc ggc cgt aag aac cac cag cga cac cac gtc ctt ccc gct cga ggc 152
Thr Gly Arg Lys Asn His Gln Arg His His Val Leu Pro Ala Arg Gly
20 25 30 35

cgg gtg ggg gcg gcg gcg gtc agg tgc tgc gcg gtg tcc ccg gtc acc 200
Arg Val Gly Ala Ala Ala Val Arg Cys Ser Ala Val Ser Pro Val Thr
40 45 50

ccg ccg tcc ccg gcg ccg ccg gcc acg ccg ctc cgg ccg tgg ggg ccg 248
Pro Pro Ser Pro Ala Pro Pro Ala Thr Pro Leu Arg Pro Trp Gly Pro
55 60 65

gcc gag ccc cgc aag ggc gcg gac atc ctc gtg gag gcg ctg gag cgg 296
Ala Glu Pro Arg Lys Gly Ala Asp Ile Leu Val Glu Ala Leu Glu Arg
70 75 80

tgc ggc gtc agc gac gtg ttc gcc tac ccg ggc ggc gcg tcc atg gag 344
Cys Gly Val Ser Asp Val Phe Ala Tyr Pro Gly Gly Ala Ser Met Glu
85 90 95

atc cac cag gcg ctg acg cgc tcc ccg gtc atc acc aac cac ctc ttc 392

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| Ile | His | Gln | Ala | Leu | Thr | Arg | Ser | Pro | Val | Ile | Thr | Asn | His | Leu | Phe | |
| 100 | | | | | 105 | | | | | 110 | | | | | 115 | |
| cgc | cac | gag | cag | ggc | gag | gcg | ttc | gcg | gcg | tcc | ggg | tac | gcg | cgc | gcg | 440 |
| Arg | His | Glu | Gln | Gly | Glu | Ala | Phe | Ala | Ala | Ser | Gly | Tyr | Ala | Arg | Ala | |
| | | | 120 | | | | | | 125 | | | | | 130 | | |
| tcc | ggc | cgc | gtc | ggg | gtc | tgc | gtc | gcc | acc | tcc | ggc | ccc | ggg | gca | acc | 488 |
| Ser | Gly | Arg | Val | Gly | Val | Cys | Val | Ala | Thr | Ser | Gly | Pro | Gly | Ala | Thr | |
| | | | 135 | | | | | 140 | | | | | 145 | | | |
| aac | ctc | gtg | tcc | gcg | ctc | gcc | gac | gcg | ctg | ctc | gac | tcc | gtc | ccg | atg | 536 |
| Asn | Leu | Val | Ser | Ala | Leu | Ala | Asp | Ala | Leu | Leu | Asp | Ser | Val | Pro | Met | |
| | | 150 | | | | | 155 | | | | | 160 | | | | |
| gtc | gcc | atc | acg | ggc | cag | gtc | cac | agc | cgc | atg | atc | ggc | acc | gac | gcc | 584 |
| Val | Ala | Ile | Thr | Gly | Gln | Val | His | Ser | Arg | Met | Ile | Gly | Thr | Asp | Ala | |
| | 165 | | | | | 170 | | | | | 175 | | | | | |
| ttc | cag | gag | acg | ccc | ata | gtc | gag | gtc | acc | cgc | tcc | atc | acc | aag | cac | 632 |
| Phe | Gln | Glu | Thr | Pro | Ile | Val | Glu | Val | Thr | Arg | Ser | Ile | Thr | Lys | His | |
| 180 | | | | | 185 | | | | 190 | | | | | 195 | | |
| aat | tac | ctt | gtc | ctt | gat | gtg | gag | gac | atc | ccc | cgc | gtc | ata | cag | gaa | 680 |
| Asn | Tyr | Leu | Val | Leu | Asp | Val | Glu | Asp | Ile | Pro | Arg | Val | Ile | Gln | Glu | |
| | | | 200 | | | | | | 205 | | | | | 210 | | |
| gcc | ttc | ttc | ctc | gcg | tcc | tcg | ggc | cgt | cct | ggc | ccg | gtg | ctg | gtc | gac | 728 |
| Ala | Phe | Phe | Leu | Ala | Ser | Ser | Gly | Arg | Pro | Gly | Pro | Val | Leu | Val | Asp | |
| | | | 215 | | | | | 220 | | | | | 225 | | | |
| atc | ccc | aag | gac | atc | cag | cag | cag | atg | gcc | gtg | ccg | gtc | tgg | gac | acc | 776 |
| Ile | Pro | Lys | Asp | Ile | Gln | Gln | Gln | Met | Ala | Val | Pro | Val | Trp | Asp | Thr | |
| | | 230 | | | | | 235 | | | | | 240 | | | | |
| tcg | atg | aat | cta | cca | ggg | tac | atc | gca | cgc | ctg | ccc | aag | cca | ccc | gcg | 824 |
| Ser | Met | Asn | Leu | Pro | Gly | Tyr | Ile | Ala | Arg | Leu | Pro | Lys | Pro | Pro | Ala | |
| | 245 | | | | | 250 | | | | | 255 | | | | | |
| aca | gaa | ttg | ctt | gag | cag | gtc | ttg | cgt | ctg | gtt | ggc | gag | tca | cgg | cgc | 872 |
| Thr | Glu | Leu | Leu | Glu | Gln | Val | Leu | Arg | Leu | Val | Gly | Glu | Ser | Arg | Arg | |
| 260 | | | | | 265 | | | | | 270 | | | | 275 | | |
| ccg | att | ctc | tat | gtc | ggg | ggg | ggc | tgc | tct | gca | tct | ggg | gac | gaa | ttg | 920 |
| Pro | Ile | Leu | Tyr | Val | Gly | Gly | Gly | Cys | Ser | Ala | Ser | Gly | Asp | Glu | Leu | |
| | | | | 280 | | | | 285 | | | | | | 290 | | |
| cgc | tgg | ttt | gtt | gag | ctg | act | ggg | atc | cca | gtt | aca | acc | act | ctg | atg | 968 |
| Arg | Trp | Phe | Val | Glu | Leu | Thr | Gly | Ile | Pro | Val | Thr | Thr | Thr | Leu | Met | |
| | | | 295 | | | | | 300 | | | | | 305 | | | |
| ggc | ctc | ggc | aat | ttc | ccc | agt | gac | gac | ccg | ttg | tcc | ctg | cgc | atg | ctt | 1016 |
| Gly | Leu | Gly | Asn | Phe | Pro | Ser | Asp | Asp | Pro | Leu | Ser | Leu | Arg | Met | Leu | |
| | | 310 | | | | | 315 | | | | | 320 | | | | |
| ggg | atg | cat | ggc | acg | gtg | tac | gca | aat | tat | gcc | gtg | gat | aag | gct | gac | 1064 |
| Gly | Met | His | Gly | Thr | Val | Tyr | Ala | Asn | Tyr | Ala | Val | Asp | Lys | Ala | Asp | |

| 325 | 330 | 335 | |
|---|-----|-----|------|
| ctg ttg ctt gcg ttt ggt gtg cgg ttt gat gat cgt gtg aca ggg aaa | | | 1112 |
| Leu Leu Leu Ala Phe Gly Val Arg Phe Asp Asp Arg Val Thr Gly Lys | | | |
| 340 | 345 | 350 | 355 |
| att gag gct ttt gca agc agg gcc aag att gtg cac att gac att gat | | | 1160 |
| Ile Glu Ala Phe Ala Ser Arg Ala Lys Ile Val His Ile Asp Ile Asp | | | |
| | 360 | 365 | 370 |
| cca gca gag att gga aag aac aag caa cca cat gtg tca att tgc gca | | | 1208 |
| Pro Ala Glu Ile Gly Lys Asn Lys Gln Pro His Val Ser Ile Cys Ala | | | |
| | 375 | 380 | 385 |
| gat gtt aag ctt gct tta cag ggc ttg aat gct ctg cta caa cag agc | | | 1256 |
| Asp Val Lys Leu Ala Leu Gln Gly Leu Asn Ala Leu Leu Gln Gln Ser | | | |
| | 390 | 395 | 400 |
| aca aca aag aca agt tct gat ttt agt gca tgg cac aat gag ttg gac | | | 1304 |
| Thr Thr Lys Thr Ser Ser Asp Phe Ser Ala Trp His Asn Glu Leu Asp | | | |
| | 405 | 410 | 415 |
| cag cag aag agg gag ttt cct ctg ggg tac aaa act ttt ggt gaa gag | | | 1352 |
| Gln Gln Lys Arg Glu Phe Pro Leu Gly Tyr Lys Thr Phe Gly Glu Glu | | | |
| 420 | 425 | 430 | 435 |
| atc cca ccg caa tat gcc att cag gtg ctg gat gag ctg acg aaa ggt | | | 1400 |
| Ile Pro Pro Gln Tyr Ala Ile Gln Val Leu Asp Glu Leu Thr Lys Gly | | | |
| | 440 | 445 | 450 |
| gag gca atc atc gct act ggt gtt ggg cag cac cag atg tgg gcg gca | | | 1448 |
| Glu Ala Ile Ile Ala Thr Gly Val Gly Gln His Gln Met Trp Ala Ala | | | |
| | 455 | 460 | 465 |
| caa tat tac acc tac aag cgg cca cgg cag tgg ctg tct tcg gct ggt | | | 1496 |
| Gln Tyr Tyr Thr Tyr Lys Arg Pro Arg Gln Trp Leu Ser Ser Ala Gly | | | |
| | 470 | 475 | 480 |
| ctg ggc gca atg gga ttt ggg ctg cct gct gca gct ggt gct tct gtg | | | 1544 |
| Leu Gly Ala Met Gly Phe Gly Leu Pro Ala Ala Ala Gly Ala Ser Val | | | |
| | 485 | 490 | 495 |
| gct aac cca ggt gtc aca gtt gtt gat att gat ggg gat ggt agc ttc | | | 1592 |
| Ala Asn Pro Gly Val Thr Val Val Asp Ile Asp Gly Asp Gly Ser Phe | | | |
| 500 | 505 | 510 | 515 |
| ctc atg aac att cag gag ctg gca ttg atc cgc att gag aac ctc cct | | | 1640 |
| Leu Met Asn Ile Gln Glu Leu Ala Leu Ile Arg Ile Glu Asn Leu Pro | | | |
| | 520 | 525 | 530 |
| gtg aag gtg atg gtg ttg aac aac caa cat ttg ggt atg gtg gtg caa | | | 1688 |
| Val Lys Val Met Val Leu Asn Asn Gln His Leu Gly Met Val Val Gln | | | |
| | 535 | 540 | 545 |
| tgg gag gat agg ttt tac aag gcg aat agg gcg cat aca tac ttg ggc | | | 1736 |
| Trp Glu Asp Arg Phe Tyr Lys Ala Asn Arg Ala His Thr Tyr Leu Gly | | | |
| | 550 | 555 | 560 |

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aac ccg gaa tgt gag agc gag ata tat cca gat ttt gtg act att gct 1784
Asn Pro Glu Cys Glu Ser Glu Ile Tyr Pro Asp Phe Val Thr Ile Ala
565 570 575

aag ggg ttc aat att cct gca gtc cgt gta aca aag aag agt gaa gtc 1832
Lys Gly Phe Asn Ile Pro Ala Val Arg Val Thr Lys Lys Ser Glu Val
580 585 590 595

cgt gcc gcc atc aag aag atg ctc gag act cca ggg cca tac ttg ttg 1880
Arg Ala Ala Ile Lys Lys Met Leu Glu Thr Pro Gly Pro Tyr Leu Leu
600 605 610

gat atc atc gtc ccg cac cag gag cat gtg ctg cct atg atc cca agt 1928
Asp Ile Ile Val Pro His Gln Glu His Val Leu Pro Met Ile Pro Ser
615 620 625

ggg ggc gca ttc aag gac atg atc ctg gat ggt gat ggc agg act gtg 1976
Gly Gly Ala Phe Lys Asp Met Ile Leu Asp Gly Asp Gly Arg Thr Val
630 635 640

tat taatctataa tctgtatggt ggcaaagcac cagcccggcc tatgtttgac 2029
Tyr

ctgaatgacc cataaagagt ggtatgccta tgatgtttgt atgtgctcta tcaataacta 2089

agggtgtcaac tatgaaccat atgctcttct gttttacttg tttgatgtgc ttggcatggg 2149

aatcctaatt agcttctctgc tgtctaggtt tgtagtgtgt tgttttctgt aggcatatgc 2209

atcacaagat atcatgtaag tttcttgtcc tacatatcaa taataagaga ataaagtact 2269

tctatgcaaa aaaaaaaaaa aaaaaaaaaa aa 2301

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<213> Oryza sativa var. kinmaze

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35 40 45

Pro Val Thr Pro Pro Ser Pro Ala Pro Pro Ala Thr Pro Leu Arg Pro
50 55 60

Trp Gly Pro Ala Glu Pro Arg Lys Gly Ala Asp Ile Leu Val Glu Ala
65 70 75 80

Leu Glu Arg Cys Gly Val Ser Asp Val Phe Ala Tyr Pro Gly Gly Ala

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| 85 | | | | | | | | | | 90 | | | | | 95 | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|--|--|
| Ser | Met | Glu | Ile | His | Gln | Ala | Leu | Thr | Arg | Ser | Pro | Val | Ile | Thr | Asn | | | | |
| | | | 100 | | | | | 105 | | | | | 110 | | | | | | |
| His | Leu | Phe | Arg | His | Glu | Gln | Gly | Glu | Ala | Phe | Ala | Ala | Ser | Gly | Tyr | | | | |
| | | 115 | | | | | 120 | | | | | 125 | | | | | | | |
| Ala | Arg | Ala | Ser | Gly | Arg | Val | Gly | Val | Cys | Val | Ala | Thr | Ser | Gly | Pro | | | | |
| | 130 | | | | | 135 | | | | | 140 | | | | | | | | |
| Gly | Ala | Thr | Asn | Leu | Val | Ser | Ala | Leu | Ala | Asp | Ala | Leu | Leu | Asp | Ser | | | | |
| 145 | | | | 150 | | | | | 155 | | | | | 160 | | | | | |
| Val | Pro | Met | Val | Ala | Ile | Thr | Gly | Gln | Val | His | Ser | Arg | Met | Ile | Gly | | | | |
| | | | 165 | | | | | 170 | | | | | 175 | | | | | | |
| Thr | Asp | Ala | Phe | Gln | Glu | Thr | Pro | Ile | Val | Glu | Val | Thr | Arg | Ser | Ile | | | | |
| | | 180 | | | | | | 185 | | | | | 190 | | | | | | |
| Thr | Lys | His | Asn | Tyr | Leu | Val | Leu | Asp | Val | Glu | Asp | Ile | Pro | Arg | Val | | | | |
| | 195 | | | | | | 200 | | | | | 205 | | | | | | | |
| Ile | Gln | Glu | Ala | Phe | Phe | Leu | Ala | Ser | Ser | Gly | Arg | Pro | Gly | Pro | Val | | | | |
| | 210 | | | | | 215 | | | | | 220 | | | | | | | | |
| Leu | Val | Asp | Ile | Pro | Lys | Asp | Ile | Gln | Gln | Gln | Met | Ala | Val | Pro | Val | | | | |
| 225 | | | | | 230 | | | | 235 | | | | | 240 | | | | | |
| Trp | Asp | Thr | Ser | Met | Asn | Leu | Pro | Gly | Tyr | Ile | Ala | Arg | Leu | Pro | Lys | | | | |
| | | | 245 | | | | | 250 | | | | | 255 | | | | | | |
| Pro | Pro | Ala | Thr | Glu | Leu | Leu | Glu | Gln | Val | Leu | Arg | Leu | Val | Gly | Glu | | | | |
| | | 260 | | | | | 265 | | | | | 270 | | | | | | | |
| Ser | Arg | Arg | Pro | Ile | Leu | Tyr | Val | Gly | Gly | Gly | Cys | Ser | Ala | Ser | Gly | | | | |
| | 275 | | | | | 280 | | | | | 285 | | | | | | | | |
| Asp | Glu | Leu | Arg | Trp | Phe | Val | Glu | Leu | Thr | Gly | Ile | Pro | Val | Thr | Thr | | | | |
| | 290 | | | | 295 | | | | 300 | | | | | | | | | | |
| Thr | Leu | Met | Gly | Leu | Gly | Asn | Phe | Pro | Ser | Asp | Asp | Pro | Leu | Ser | Leu | | | | |
| 305 | | | | 310 | | | | | 315 | | | | | 320 | | | | | |
| Arg | Met | Leu | Gly | Met | His | Gly | Thr | Val | Tyr | Ala | Asn | Tyr | Ala | Val | Asp | | | | |
| | | | 325 | | | | | 330 | | | | | 335 | | | | | | |
| Lys | Ala | Asp | Leu | Leu | Leu | Ala | Phe | Gly | Val | Arg | Phe | Asp | Asp | Arg | Val | | | | |
| | 340 | | | | | | 345 | | | | | 350 | | | | | | | |
| Thr | Gly | Lys | Ile | Glu | Ala | Phe | Ala | Ser | Arg | Ala | Lys | Ile | Val | His | Ile | | | | |
| | 355 | | | | 360 | | | | | | 365 | | | | | | | | |
| Asp | Ile | Asp | Pro | Ala | Glu | Ile | Gly | Lys | Asn | Lys | Gln | Pro | His | Val | Ser | | | | |
| 370 | | | | | 375 | | | | 380 | | | | | | | | | | |
| Ile | Cys | Ala | Asp | Val | Lys | Leu | Ala | Leu | Gln | Gly | Leu | Asn | Ala | Leu | Leu | | | | |

| | | | | | | |
|---------------------|---------------------|-------------------------|-----------------|-----|--|-----|
| 385 | | 390 | | 395 | | 400 |
| Gln Gln Ser Thr | Thr Lys Thr Ser Ser | Asp Phe Ser Ala Trp | His Asn | | | |
| | 405 | 410 | 415 | | | |
| Glu Leu Asp | Gln Gln Lys Arg | Glu Phe Pro Leu Gly Tyr | Lys Thr Phe | | | |
| | 420 | 425 | 430 | | | |
| Gly Glu Glu Ile | Pro Pro Gln Tyr | Ala Ile Gln Val | Leu Asp Glu Leu | | | |
| | 435 | 440 | 445 | | | |
| Thr Lys Gly Glu | Ala Ile Ile Ala Thr | Gly Val Gly Gln His | Gln Met | | | |
| | 450 | 455 | 460 | | | |
| Trp Ala Ala Gln Tyr | Tyr Thr Tyr Lys Arg | Pro Arg Gln Trp | Leu Ser | | | |
| 465 | 470 | 475 | 480 | | | |
| Ser Ala Gly Leu | Gly Ala Met Gly Phe | Gly Leu Pro Ala Ala | Ala Gly | | | |
| | 485 | 490 | 495 | | | |
| Ala Ser Val Ala | Asn Pro Gly Val | Thr Val Val Asp | Ile Asp Gly Asp | | | |
| | 500 | 505 | 510 | | | |
| Gly Ser Phe Leu | Met Asn Ile Gln Glu | Leu Ala Leu Ile | Arg Ile Glu | | | |
| | 515 | 520 | 525 | | | |
| Asn Leu Pro Val | Lys Val Met Val | Leu Asn Asn Gln | His Leu Gly Met | | | |
| | 530 | 535 | 540 | | | |
| Val Val Gln Trp | Glu Asp Arg Phe Tyr | Lys Ala Asn Arg | Ala His Thr | | | |
| 545 | 550 | 555 | 560 | | | |
| Tyr Leu Gly Asn | Pro Glu Cys Glu Ser | Glu Ile Tyr Pro | Asp Phe Val | | | |
| | 565 | 570 | 575 | | | |
| Thr Ile Ala Lys | Gly Phe Asn Ile Pro | Ala Val Arg Val | Thr Lys Lys | | | |
| | 580 | 585 | 590 | | | |
| Ser Glu Val Arg | Ala Ala Ile Lys Lys | Met Leu Glu Thr | Pro Gly Pro | | | |
| | 595 | 600 | 605 | | | |
| Tyr Leu Leu Asp | Ile Ile Val Pro His | Gln Glu His Val | Leu Pro Met | | | |
| | 610 | 615 | 620 | | | |
| Ile Pro Ser Gly | Gly Ala Phe Lys Asp | Met Ile Leu Asp | Gly Asp Gly | | | |
| 625 | 630 | 635 | 640 | | | |
| Arg Thr Val Tyr | | | | | | |

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 <222> (48)..(1979)

<400> 3

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Thr Ala Ala Ala Ala Ala Ala Ala Ala Leu Ser Ala Ala Ala Thr Ala Lys
      5                      10                      15

acc ggc cgt aag aac cac cag cga cac cac gtc ctt ccc gct cga ggc      152
Thr Gly Arg Lys Asn His Gln Arg His His Val Leu Pro Ala Arg Gly
      20                      25                      30                      35

cgg gtg ggg gcg gcg gcg gtc agg tgc tgc gcg gtg tcc ccg gtc acc      200
Arg Val Gly Ala Ala Ala Val Arg Cys Ser Ala Val Ser Pro Val Thr
                      40                      45                      50

ccg ccg tcc ccg gcg ccg ccg gcc acg ccg ctc cgg ccg tgg ggg ccg      248
Pro Pro Ser Pro Ala Pro Pro Ala Thr Pro Leu Arg Pro Trp Gly Pro
      55                      60                      65

gcc gag ccc cgc aag ggc gcg gac atc ctc gtg gag gcg ctg gag cgg      296
Ala Glu Pro Arg Lys Gly Ala Asp Ile Leu Val Glu Ala Leu Glu Arg
      70                      75                      80

tgc ggc gtc agc gac gtg ttc gcc tac ccg ggc ggc gcg tcc atg gag      344
Cys Gly Val Ser Asp Val Phe Ala Tyr Pro Gly Gly Ala Ser Met Glu
      85                      90                      95

atc cac cag gcg ctg acg cgc tcc ccg gtc atc acc aac cac ctc ttc      392
Ile His Gln Ala Leu Thr Arg Ser Pro Val Ile Thr Asn His Leu Phe
      100                      105                      110                      115

cgc cac gag cag ggc gag gcg ttc gcg gcg tcc ggg tac gcg cgc gcg      440
Arg His Glu Gln Gly Glu Ala Phe Ala Ala Ser Gly Tyr Ala Arg Ala
                      120                      125                      130

tcc ggc cgc gtc ggg gtc tgc gtc gcc acc tcc ggc ccc ggg gca acc      488
Ser Gly Arg Val Gly Val Cys Val Ala Thr Ser Gly Pro Gly Ala Thr
                      135                      140                      145

aac ctc gtg tcc gcg ctc gcc gac gcg ctg ctc gac tcc gtc ccg atg      536
Asn Leu Val Ser Ala Leu Ala Asp Ala Leu Leu Asp Ser Val Pro Met
                      150                      155                      160

gtc gcc atc acg ggc cag gtc cac cgc cgc atg atc ggc acc gac gcc      584
Val Ala Ile Thr Gly Gln Val His Arg Arg Met Ile Gly Thr Asp Ala
      165                      170                      175

ttc cag gag acg ccc ata gtc gag gtc acc cgc tcc atc acc aag cac      632
Phe Gln Glu Thr Pro Ile Val Glu Val Thr Arg Ser Ile Thr Lys His
      180                      185                      190                      195

aat tac ctt gtc ctt gat gtg gag gac atc ccc cgc gtc ata cag gaa      680

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| | | | | |
|---|---------------------|-----------------|-------------|--|
| Asn Tyr Leu Val | Leu Asp Val Glu Asp | Ile Pro Arg Val | Ile Gln Glu | |
| 200 | | 205 | 210 | |
| gcc ttc ttc ctc gcg tcc tcg ggc cgt cct ggc ccg gtg ctg gtc gac | 728 | | | |
| Ala Phe Phe Leu Ala Ser Ser Gly Arg Pro Gly Pro Val Leu Val Asp | | | | |
| 215 | 220 | 225 | | |
| atc ccc aag gac atc cag cag cag atg gcc gtg ccg gtc tgg gac acc | 776 | | | |
| Ile Pro Lys Asp Ile Gln Gln Gln Met Ala Val Pro Val Trp Asp Thr | | | | |
| 230 | 235 | 240 | | |
| tcg atg aat cta cca ggg tac atc gca cgc ctg ccc aag cca ccc gcg | 824 | | | |
| Ser Met Asn Leu Pro Gly Tyr Ile Ala Arg Leu Pro Lys Pro Pro Ala | | | | |
| 245 | 250 | 255 | | |
| aca gaa ttg ctt gag cag gtc ttg cgt ctg gtt ggc gag tca cgg cgc | 872 | | | |
| Thr Glu Leu Leu Glu Gln Val Leu Arg Leu Val Gly Glu Ser Arg Arg | | | | |
| 260 | 265 | 270 | 275 | |
| ccg att ctc tat gtc ggt ggt ggc tgc tct gca tct ggt gac gaa ttg | 920 | | | |
| Pro Ile Leu Tyr Val Gly Gly Gly Cys Ser Ala Ser Gly Asp Glu Leu | | | | |
| 280 | 285 | 290 | | |
| cgc tgg ttt gtt gag ctg act ggt atc cca gtt aca acc act ctg atg | 968 | | | |
| Arg Trp Phe Val Glu Leu Thr Gly Ile Pro Val Thr Thr Thr Leu Met | | | | |
| 295 | 300 | 305 | | |
| ggc ctc ggc aat ttc ccc agt gac gac ccg ttg tcc ctg cgc atg ctt | 1016 | | | |
| Gly Leu Gly Asn Phe Pro Ser Asp Asp Pro Leu Ser Leu Arg Met Leu | | | | |
| 310 | 315 | 320 | | |
| ggg atg cat ggc acg gtg tac gca aat tat gcc gtg gat aag gct gac | 1064 | | | |
| Gly Met His Gly Thr Val Tyr Ala Asn Tyr Ala Val Asp Lys Ala Asp | | | | |
| 325 | 330 | 335 | | |
| ctg ttg ctt gcg ttt ggt gtg cgg ttt gat gat cgt gtg aca ggg aaa | 1112 | | | |
| Leu Leu Leu Ala Phe Gly Val Arg Phe Asp Asp Arg Val Thr Gly Lys | | | | |
| 340 | 345 | 350 | 355 | |
| att gag gct ttt gca agc agg gcc aag att gtg cac att gac att gat | 1160 | | | |
| Ile Glu Ala Phe Ala Ser Arg Ala Lys Ile Val His Ile Asp Ile Asp | | | | |
| 360 | 365 | 370 | | |
| cca gca gag att gga aag aac aag caa cca cat gtg tca att tgc gca | 1208 | | | |
| Pro Ala Glu Ile Gly Lys Asn Lys Gln Pro His Val Ser Ile Cys Ala | | | | |
| 375 | 380 | 385 | | |
| gat gtt aag ctt gct tta cag ggc ttg aat gct ctg cta caa cag agc | 1256 | | | |
| Asp Val Lys Leu Ala Leu Gln Gly Leu Asn Ala Leu Leu Gln Gln Ser | | | | |
| 390 | 395 | 400 | | |
| aca aca aag aca agt tct gat ttt agt gca tgg cac aat gag ttg gac | 1304 | | | |
| Thr Thr Lys Thr Ser Ser Asp Phe Ser Ala Trp His Asn Glu Leu Asp | | | | |
| 405 | 410 | 415 | | |
| cag cag aag agg gag ttt cct ctg ggg tac aaa act ttt ggt gaa gag | 1352 | | | |
| Gln Gln Lys Arg Glu Phe Pro Leu Gly Tyr Lys Thr Phe Gly Glu Glu | | | | |

| | | | | | | | |
|---|-----|-----|-----|-----|-----|-----|------|
| 420 | | 425 | | 430 | | 435 | |
| atc cca ccg caa tat gcc att cag gtg ctg gat gag ctg acg aaa ggt | | | | | | | 1400 |
| Ile Pro Pro Gln Tyr Ala Ile Gln Val Leu Asp Glu Leu Thr Lys Gly | | | | | | | |
| | 440 | | 445 | | 450 | | |
| gag gca atc atc gct act ggt gtt ggg cag cac cag atg tgg gcg gca | | | | | | | 1448 |
| Glu Ala Ile Ile Ala Thr Gly Val Gly Gln His Gln Met Trp Ala Ala | | | | | | | |
| | 455 | | 460 | | 465 | | |
| caa tat tac acc tac aag cgg cca cgg cag tgg ctg tct tcg gct ggt | | | | | | | 1496 |
| Gln Tyr Tyr Thr Tyr Lys Arg Pro Arg Gln Trp Leu Ser Ser Ala Gly | | | | | | | |
| | 470 | | 475 | | 480 | | |
| ctg ggc gca atg gga ttt ggg ctg cct gct gca gct ggt gct tct gtg | | | | | | | 1544 |
| Leu Gly Ala Met Gly Phe Gly Leu Pro Ala Ala Ala Gly Ala Ser Val | | | | | | | |
| | 485 | | 490 | | 495 | | |
| gct aac cca ggt gtc aca gtt gtt gat att gat ggg gat ggt agc ttc | | | | | | | 1592 |
| Ala Asn Pro Gly Val Thr Val Val Asp Ile Asp Gly Asp Gly Ser Phe | | | | | | | |
| 500 | | 505 | | 510 | | 515 | |
| ctc atg aac att cag gag ctg gca ttg atc cgc att gag aac ctc cct | | | | | | | 1640 |
| Leu Met Asn Ile Gln Glu Leu Ala Leu Ile Arg Ile Glu Asn Leu Pro | | | | | | | |
| | 520 | | 525 | | 530 | | |
| gtg aag gtg atg gtg ttg aac aac caa cat ttg ggt atg gtg gtg caa | | | | | | | 1688 |
| Val Lys Val Met Val Leu Asn Asn Gln His Leu Gly Met Val Val Gln | | | | | | | |
| | 535 | | 540 | | 545 | | |
| ttg gag gat agg ttt tac aag gcg aat agg gcg cat aca tac ttg ggc | | | | | | | 1736 |
| Leu Glu Asp Arg Phe Tyr Lys Ala Asn Arg Ala His Thr Tyr Leu Gly | | | | | | | |
| | 550 | | 555 | | 560 | | |
| aac ccg gaa tgt gag agc gag ata tat cca gat ttt gtg act att gct | | | | | | | 1784 |
| Asn Pro Glu Cys Glu Ser Glu Ile Tyr Pro Asp Phe Val Thr Ile Ala | | | | | | | |
| | 565 | | 570 | | 575 | | |
| aag ggg ttc aat att cct gca gtc cgt gta aca aag aag agt gaa gtc | | | | | | | 1832 |
| Lys Gly Phe Asn Ile Pro Ala Val Arg Val Thr Lys Lys Ser Glu Val | | | | | | | |
| 580 | | 585 | | 590 | | 595 | |
| cgt gcc gcc atc aag aag atg ctc gag act cca ggg cca tac ttg ttg | | | | | | | 1880 |
| Arg Ala Ala Ile Lys Lys Met Leu Glu Thr Pro Gly Pro Tyr Leu Leu | | | | | | | |
| | 600 | | 605 | | 610 | | |
| gat atc atc gtc ccg cac cag gag cat gtg ctg cct atg atc cca agt | | | | | | | 1928 |
| Asp Ile Ile Val Pro His Gln Glu His Val Leu Pro Met Ile Pro Ser | | | | | | | |
| | 615 | | 620 | | 625 | | |
| ggg ggc gca ttc aag gac atg atc ctg gat ggt gat ggc agg act gtg | | | | | | | 1976 |
| Gly Gly Ala Phe Lys Asp Met Ile Leu Asp Gly Asp Gly Arg Thr Val | | | | | | | |
| | 630 | | 635 | | 640 | | |
| tat taatctataa tctgtatggt ggcaaagcac cagcccggcc tatgtttgac | | | | | | | 2029 |
| Tyr | | | | | | | |

ctgaatgacc cataaagagt ggtatgccta tgatgtttgt atgtgctcta tcaataacta 2089
 aggtgtcaac tatgaaccat atgctcttct gttttacttg tttgatgtgc ttggcatggg 2149
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 Pro Val Thr Pro Pro Ser Pro Ala Pro Pro Ala Thr Pro Leu Arg Pro
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 Trp Gly Pro Ala Glu Pro Arg Lys Gly Ala Asp Ile Leu Val Glu Ala
 65 70 75 80
 Leu Glu Arg Cys Gly Val Ser Asp Val Phe Ala Tyr Pro Gly Gly Ala
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 Ser Met Glu Ile His Gln Ala Leu Thr Arg Ser Pro Val Ile Thr Asn
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 His Leu Phe Arg His Glu Gln Gly Glu Ala Phe Ala Ala Ser Gly Tyr
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 Gly Ala Thr Asn Leu Val Ser Ala Leu Ala Asp Ala Leu Leu Asp Ser
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 165 170 175
 Thr Asp Ala Phe Gln Glu Thr Pro Ile Val Glu Val Thr Arg Ser Ile
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 Thr Lys His Asn Tyr Leu Val Leu Asp Val Glu Asp Ile Pro Arg Val
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 Ile Gln Glu Ala Phe Phe Leu Ala Ser Ser Gly Arg Pro Gly Pro Val

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| Leu Val Asp Ile Pro Lys Asp Ile Gln Gln Gln Met Ala Val Pro Val | | |
| 225 | 230 | 235 240 |
| Trp Asp Thr Ser Met Asn Leu Pro Gly Tyr Ile Ala Arg Leu Pro Lys | | |
| | 245 | 250 255 |
| Pro Pro Ala Thr Glu Leu Leu Glu Gln Val Leu Arg Leu Val Gly Glu | | |
| | 260 | 265 270 |
| Ser Arg Arg Pro Ile Leu Tyr Val Gly Gly Gly Cys Ser Ala Ser Gly | | |
| | 275 | 280 285 |
| Asp Glu Leu Arg Trp Phe Val Glu Leu Thr Gly Ile Pro Val Thr Thr | | |
| | 290 | 295 300 |
| Thr Leu Met Gly Leu Gly Asn Phe Pro Ser Asp Asp Pro Leu Ser Leu | | |
| 305 | 310 | 315 320 |
| Arg Met Leu Gly Met His Gly Thr Val Tyr Ala Asn Tyr Ala Val Asp | | |
| | 325 | 330 335 |
| Lys Ala Asp Leu Leu Leu Ala Phe Gly Val Arg Phe Asp Asp Arg Val | | |
| | 340 | 345 350 |
| Thr Gly Lys Ile Glu Ala Phe Ala Ser Arg Ala Lys Ile Val His Ile | | |
| | 355 | 360 365 |
| Asp Ile Asp Pro Ala Glu Ile Gly Lys Asn Lys Gln Pro His Val Ser | | |
| | 370 | 375 380 |
| Ile Cys Ala Asp Val Lys Leu Ala Leu Gln Gly Leu Asn Ala Leu Leu | | |
| 385 | 390 | 395 400 |
| Gln Gln Ser Thr Thr Lys Thr Ser Ser Asp Phe Ser Ala Trp His Asn | | |
| | 405 | 410 415 |
| Glu Leu Asp Gln Gln Lys Arg Glu Phe Pro Leu Gly Tyr Lys Thr Phe | | |
| | 420 | 425 430 |
| Gly Glu Glu Ile Pro Pro Gln Tyr Ala Ile Gln Val Leu Asp Glu Leu | | |
| | 435 | 440 445 |
| Thr Lys Gly Glu Ala Ile Ile Ala Thr Gly Val Gly Gln His Gln Met | | |
| | 450 | 455 460 |
| Trp Ala Ala Gln Tyr Tyr Thr Tyr Lys Arg Pro Arg Gln Trp Leu Ser | | |
| 465 | 470 | 475 480 |
| Ser Ala Gly Leu Gly Ala Met Gly Phe Gly Leu Pro Ala Ala Ala Gly | | |
| | 485 | 490 495 |
| Ala Ser Val Ala Asn Pro Gly Val Thr Val Val Asp Ile Asp Gly Asp | | |
| | 500 | 505 510 |
| Gly Ser Phe Leu Met Asn Ile Gln Glu Leu Ala Leu Ile Arg Ile Glu | | |

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|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asn | Leu | Pro | Val | Lys | Val | Met | Val | Leu | Asn | Asn | Gln | His | Leu | Gly | Met |
| 530 | | | | | 535 | | | | | 540 | | | | | |
| Val | Val | Gln | Leu | Glu | Asp | Arg | Phe | Tyr | Lys | Ala | Asn | Arg | Ala | His | Thr |
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| Tyr | Leu | Gly | Asn | Pro | Glu | Cys | Glu | Ser | Glu | Ile | Tyr | Pro | Asp | Phe | Val |
| | | | 565 | | | | | | 570 | | | | | 575 | |
| Thr | Ile | Ala | Lys | Gly | Phe | Asn | Ile | Pro | Ala | Val | Arg | Val | Thr | Lys | Lys |
| | | | 580 | | | | | 585 | | | | | 590 | | |
| Ser | Glu | Val | Arg | Ala | Ala | Ile | Lys | Lys | Met | Leu | Glu | Thr | Pro | Gly | Pro |
| | | 595 | | | | | 600 | | | | | 605 | | | |
| Tyr | Leu | Leu | Asp | Ile | Ile | Val | Pro | His | Gln | Glu | His | Val | Leu | Pro | Met |
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| Ile | Pro | Ser | Gly | Gly | Ala | Phe | Lys | Asp | Met | Ile | Leu | Asp | Gly | Asp | Gly |
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| cccaaaccga gaaaccctcg cgcgcgccgc cgcgcgcacc acccacc | | | | | | | | | | | | | | atg gct acg | 56 |
| | | | | | | | | | | | | | | Met Ala Thr | |
| | | | | | | | | | | | | | | 1 | |
| acc gcc gcg gcc gcg gcc gcc gcc ctg tcc gcc gcc gcg acg gcc aag | | | | | | | | | | | | | | 104 | |
| Thr Ala Ala Ala Ala Ala Ala Ala Leu Ser Ala Ala Ala Thr Ala Lys | | | | | | | | | | | | | | | |
| 5 10 15 | | | | | | | | | | | | | | | |
| acc ggc cgt aag aac cac cag cga cac cac gtc ctt ccc gct cga ggc | | | | | | | | | | | | | | 152 | |
| Thr Gly Arg Lys Asn His Gln Arg His His Val Leu Pro Ala Arg Gly | | | | | | | | | | | | | | | |
| 20 25 30 35 | | | | | | | | | | | | | | | |
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| Arg Val Gly Ala Ala Ala Val Arg Cys Ser Ala Val Ser Pro Val Thr | | | | | | | | | | | | | | | |
| 40 45 50 | | | | | | | | | | | | | | | |
| ccg ccg tcc ccg gcg ccg ccg gcc acg ccg ctc cgg ccg tgg ggg ccg | | | | | | | | | | | | | | 248 | |
| Pro Pro Ser Pro Ala Pro Pro Ala Thr Pro Leu Arg Pro Trp Gly Pro | | | | | | | | | | | | | | | |
| 55 60 65 | | | | | | | | | | | | | | | |

| | |
|---|-----|
| gcc gag ccc cgc aag ggc gcg gac atc ctc gtg gag gcg ctg gag cgg | 296 |
| Ala Glu Pro Arg Lys Gly Ala Asp Ile Leu Val Glu Ala Leu Glu Arg | |
| 70 75 80 | |
| tgc ggc gtc agc gac gtg ttc gcc tac ccg ggc ggc gcg tcc atg gag | 344 |
| Cys Gly Val Ser Asp Val Phe Ala Tyr Pro Gly Gly Ala Ser Met Glu | |
| 85 90 95 | |
| atc cac cag gcg ctg acg cgc tcc ccg gtc atc acc aac cac ctc ttc | 392 |
| Ile His Gln Ala Leu Thr Arg Ser Pro Val Ile Thr Asn His Leu Phe | |
| 100 105 110 115 | |
| cgc cac gag cag ggc gag gcg ttc gcg gcg tcc ggg tac gcg cgc gcg | 440 |
| Arg His Glu Gln Gly Glu Ala Phe Ala Ala Ser Gly Tyr Ala Arg Ala | |
| 120 125 130 | |
| tcc ggc cgc gtc ggg gtc tgc gtc gcc acc tcc ggc ccc ggg gca acc | 488 |
| Ser Gly Arg Val Gly Val Cys Val Ala Thr Ser Gly Pro Gly Ala Thr | |
| 135 140 145 | |
| aac ctc gtg tcc gcg ctc gcc gac gcg ctg ctc gac tcc gtc ccg atg | 536 |
| Asn Leu Val Ser Ala Leu Ala Asp Ala Leu Leu Asp Ser Val Pro Met | |
| 150 155 160 | |
| gtc gcc atc acg ggc cag gtc cac cgc cgc atg atc ggc acc gac gcc | 584 |
| Val Ala Ile Thr Gly Gln Val His Arg Arg Met Ile Gly Thr Asp Ala | |
| 165 170 175 | |
| ttc cag gag acg ccc ata gtc gag gtc acc cgc tcc atc acc aag cac | 632 |
| Phe Gln Glu Thr Pro Ile Val Glu Val Thr Arg Ser Ile Thr Lys His | |
| 180 185 190 195 | |
| aat tac ctt gtc ctt gat gtg gag gac atc ccc cgc gtc ata cag gaa | 680 |
| Asn Tyr Leu Val Leu Asp Val Glu Asp Ile Pro Arg Val Ile Gln Glu | |
| 200 205 210 | |
| gcc ttc ttc ctc gcg tcc tcg ggc cgt cct ggc ccg gtg ctg gtc gac | 728 |
| Ala Phe Phe Leu Ala Ser Ser Gly Arg Pro Gly Pro Val Leu Val Asp | |
| 215 220 225 | |
| atc ccc aag gac atc cag cag cag atg gcc gtg ccg gtc tgg gac acc | 776 |
| Ile Pro Lys Asp Ile Gln Gln Gln Met Ala Val Pro Val Trp Asp Thr | |
| 230 235 240 | |
| tcg atg aat cta cca ggg tac atc gca cgc ctg ccc aag cca ccc gcg | 824 |
| Ser Met Asn Leu Pro Gly Tyr Ile Ala Arg Leu Pro Lys Pro Pro Ala | |
| 245 250 255 | |
| aca gaa ttg ctt gag cag gtc ttg cgt ctg gtt ggc gag tca cgg cgc | 872 |
| Thr Glu Leu Leu Glu Gln Val Leu Arg Leu Val Gly Glu Ser Arg Arg | |
| 260 265 270 275 | |
| ccg att ctc tat gtc ggt ggt ggc tgc tct gca tct ggt gac gaa ttg | 920 |
| Pro Ile Leu Tyr Val Gly Gly Gly Cys Ser Ala Ser Gly Asp Glu Leu | |
| 280 285 290 | |
| cgc tgg ttt gtt gag ctg act ggt atc cca gtt aca acc act ctg atg | 968 |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| Arg | Trp | Phe | Val | Glu | Leu | Thr | Gly | Ile | Pro | Val | Thr | Thr | Thr | Leu | Met | |
| | | | 295 | | | | | 300 | | | | | | 305 | | |
| ggc | ctc | ggc | aat | ttc | ccc | agt | gac | gac | ccg | ttg | tcc | ctg | cgc | atg | ctt | 1016 |
| Gly | Leu | Gly | Asn | Phe | Pro | Ser | Asp | Asp | Pro | Leu | Ser | Leu | Arg | Met | Leu | |
| | | 310 | | | | | 315 | | | | | 320 | | | | |
| ggg | atg | cat | ggc | acg | gtg | tac | gca | aat | tat | gcc | gtg | gat | aag | gct | gac | 1064 |
| Gly | Met | His | Gly | Thr | Val | Tyr | Ala | Asn | Tyr | Ala | Val | Asp | Lys | Ala | Asp | |
| | 325 | | | | | 330 | | | | 335 | | | | | | |
| ctg | ttg | ctt | gcg | ttt | ggg | gtg | cgg | ttt | gat | gat | cgt | gtg | aca | ggg | aaa | 1112 |
| Leu | Leu | Leu | Ala | Phe | Gly | Val | Arg | Phe | Asp | Asp | Arg | Val | Thr | Gly | Lys | |
| 340 | | | | | 345 | | | | 350 | | | | | | 355 | |
| att | gag | gct | ttt | gca | agc | agg | gcc | aag | att | gtg | cac | att | gac | att | gat | 1160 |
| Ile | Glu | Ala | Phe | Ala | Ser | Arg | Ala | Lys | Ile | Val | His | Ile | Asp | Ile | Asp | |
| | | | 360 | | | | | 365 | | | | | 370 | | | |
| cca | gca | gag | att | gga | aag | aac | aag | caa | cca | cat | gtg | tca | att | tgc | gca | 1208 |
| Pro | Ala | Glu | Ile | Gly | Lys | Asn | Lys | Gln | Pro | His | Val | Ser | Ile | Cys | Ala | |
| | | | 375 | | | | | 380 | | | | | 385 | | | |
| gat | gtt | aag | ctt | gct | tta | cag | ggc | ttg | aat | gct | ctg | cta | caa | cag | agc | 1256 |
| Asp | Val | Lys | Leu | Ala | Leu | Gln | Gly | Leu | Asn | Ala | Leu | Leu | Gln | Gln | Ser | |
| | | 390 | | | | | 395 | | | | | 400 | | | | |
| aca | aca | aag | aca | agt | tct | gat | ttt | agt | gca | tgg | cac | aat | gag | ttg | gac | 1304 |
| Thr | Thr | Lys | Thr | Ser | Ser | Asp | Phe | Ser | Ala | Trp | His | Asn | Glu | Leu | Asp | |
| | 405 | | | | | 410 | | | | | 415 | | | | | |
| cag | cag | aag | agg | gag | ttt | cct | ctg | ggg | tac | aaa | act | ttt | ggg | gaa | gag | 1352 |
| Gln | Gln | Lys | Arg | Glu | Phe | Pro | Leu | Gly | Tyr | Lys | Thr | Phe | Gly | Glu | Glu | |
| 420 | | | | | 425 | | | | 430 | | | | | 435 | | |
| atc | cca | ccg | caa | tat | gcc | att | cag | gtg | ctg | gat | gag | ctg | acg | aaa | ggg | 1400 |
| Ile | Pro | Pro | Gln | Tyr | Ala | Ile | Gln | Val | Leu | Asp | Glu | Leu | Thr | Lys | Gly | |
| | | | 440 | | | | 445 | | | | | | 450 | | | |
| gag | gca | atc | atc | gct | act | ggg | gtt | ggg | cag | cac | cag | atg | tgg | gcg | gca | 1448 |
| Glu | Ala | Ile | Ile | Ala | Thr | Gly | Val | Gly | Gln | His | Gln | Met | Trp | Ala | Ala | |
| | | | 455 | | | | 460 | | | | | | 465 | | | |
| caa | tat | tac | acc | tac | aag | cgg | cca | cgg | cag | tgg | ctg | tct | tcg | gct | ggg | 1496 |
| Gln | Tyr | Tyr | Thr | Tyr | Lys | Arg | Pro | Arg | Gln | Trp | Leu | Ser | Ser | Ala | Gly | |
| | | 470 | | | | | 475 | | | | | 480 | | | | |
| ctg | ggc | gca | atg | gga | ttt | ggg | ctg | cct | gct | gca | gct | ggg | gct | tct | gtg | 1544 |
| Leu | Gly | Ala | Met | Gly | Phe | Gly | Leu | Pro | Ala | Ala | Ala | Gly | Ala | Ser | Val | |
| | 485 | | | | | 490 | | | | | 495 | | | | | |
| gct | aac | cca | ggg | gtc | aca | gtt | gtt | gat | att | gat | ggg | gat | ggg | agc | ttc | 1592 |
| Ala | Asn | Pro | Gly | Val | Thr | Val | Val | Asp | Ile | Asp | Gly | Asp | Gly | Ser | Phe | |
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| ctc | atg | aac | att | cag | gag | ctg | gca | ttg | atc | cgc | att | gag | aac | ctc | cct | 1640 |
| Leu | Met | Asn | Ile | Gln | Glu | Leu | Ala | Leu | Ile | Arg | Ile | Glu | Asn | Leu | Pro | |

| 520 | | | | | | | | | | 525 | | | | | 530 | | | | | |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|--|--|--|--|
| gtg | aag | gtg | atg | gtg | ttg | aac | aac | caa | cat | ttg | ggg | atg | gtg | gtg | caa | 1688 | | | | |
| Val | Lys | Val | Met | Val | Leu | Asn | Asn | Gln | His | Leu | Gly | Met | Val | Val | Gln | | | | | |
| 535 | | | | | 540 | | | | | 545 | | | | | | | | | | |
| tg | gag | gat | agg | ttt | tac | aag | gag | aat | agg | gag | cat | aca | tac | ttg | ggc | 1736 | | | | |
| Trp | Glu | Asp | Arg | Phe | Tyr | Lys | Ala | Asn | Arg | Ala | His | Thr | Tyr | Leu | Gly | | | | | |
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| aac | ccg | gaa | tgt | gag | agc | gag | ata | tat | cca | gat | ttt | gtg | act | att | gct | 1784 | | | | |
| Asn | Pro | Glu | Cys | Glu | Ser | Glu | Ile | Tyr | Pro | Asp | Phe | Val | Thr | Ile | Ala | | | | | |
| 565 | | | | | 570 | | | | | 575 | | | | | | | | | | |
| aag | ggg | ttc | aat | att | cct | gca | gtc | cgt | gta | aca | aag | aag | agt | gaa | gtc | 1832 | | | | |
| Lys | Gly | Phe | Asn | Ile | Pro | Ala | Val | Arg | Val | Thr | Lys | Lys | Ser | Glu | Val | | | | | |
| 580 | | | | | 585 | | | | | 590 | | | | | 595 | | | | | |
| cgt | gcc | gcc | atc | aag | aag | atg | ctc | gag | act | cca | ggg | cca | tac | ttg | ttg | 1880 | | | | |
| Arg | Ala | Ala | Ile | Lys | Lys | Met | Leu | Glu | Thr | Pro | Gly | Pro | Tyr | Leu | Leu | | | | | |
| 600 | | | | | 605 | | | | | 610 | | | | | | | | | | |
| gat | atc | atc | gtc | ccg | cac | cag | gag | cat | gtg | ctg | cct | atg | atc | cca | att | 1928 | | | | |
| Asp | Ile | Ile | Val | Pro | His | Gln | Glu | His | Val | Leu | Pro | Met | Ile | Pro | Ile | | | | | |
| 615 | | | | | 620 | | | | | 625 | | | | | | | | | | |
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| Gly | Gly | Ala | Phe | Lys | Asp | Met | Ile | Leu | Asp | Gly | Asp | Gly | Arg | Thr | Val | | | | | |
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| tat taatctataa tctgtatggt ggcaaagcac cagcccggcc tatgtttgac 2029 | | | | | | | | | | | | | | | | | | | | |
| Tyr | | | | | | | | | | | | | | | | | | | | |
| ctgaatgacc cataaagagt ggtatgccta tgatgtttgt atgtgctcta tcaataacta 2089 | | | | | | | | | | | | | | | | | | | | |
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| aatcctaatt agcttctgc tgtctagggt tgtagtgtgt tgttttctgt aggcataatgc 2209 | | | | | | | | | | | | | | | | | | | | |
| atcacaagat atcatgtaag tttcttgtcc tacatatcaa taataagaga ataaagtact 2269 | | | | | | | | | | | | | | | | | | | | |
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| 35 | | | | | 40 | | | | | 45 | | | | | |
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| Pro | Val | Thr | Pro | Pro | Ser | Pro | Ala | Pro | Pro | Ala | Thr | Pro | Leu | Arg | Pro |
| 50 | | | | | | 55 | | | | | 60 | | | | |
| Trp | Gly | Pro | Ala | Glu | Pro | Arg | Lys | Gly | Ala | Asp | Ile | Leu | Val | Glu | Ala |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| Leu | Glu | Arg | Cys | Gly | Val | Ser | Asp | Val | Phe | Ala | Tyr | Pro | Gly | Gly | Ala |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Ser | Met | Glu | Ile | His | Gln | Ala | Leu | Thr | Arg | Ser | Pro | Val | Ile | Thr | Asn |
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| Phe Gln Glu Thr Pro Ile Val Glu Val Thr Arg Ser Ile Thr Lys His | |
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| Pro Ala Glu Ile Gly Lys Asn Lys Gln Pro His Val Ser Ile Cys Ala | |
| 375 380 385 | |
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| Thr | Thr | Lys | Thr | Ser | Ser | Asp | Phe | Ser | Ala | Trp | His | Asn | Glu | Leu | Asp | | |
| | | 405 | | | | 410 | | | | | 415 | | | | | | |
| cag | cag | aag | agg | gag | ttt | cct | ctg | ggg | tac | aaa | act | ttt | ggt | gaa | gag | 1352 | |
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| gag | gca | atc | atc | gct | act | ggg | gtt | ggg | cag | cac | cag | atg | tgg | gcg | gca | 1448 | |
| Glu | Ala | Ile | Ile | Ala | Thr | Gly | Val | Gly | Gln | His | Gln | Met | Trp | Ala | Ala | | |
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| caa | tat | tac | acc | tac | aag | cgg | cca | cgg | cag | tgg | ctg | tct | tcg | gct | ggg | 1496 | |
| Gln | Tyr | Tyr | Thr | Tyr | Lys | Arg | Pro | Arg | Gln | Trp | Leu | Ser | Ser | Ala | Gly | | |
| | | 470 | | | | | | 475 | | | | 480 | | | | | |
| ctg | ggc | gca | atg | gga | ttt | ggg | ctg | cct | gct | gca | gct | ggg | gct | tct | gtg | 1544 | |
| Leu | Gly | Ala | Met | Gly | Phe | Gly | Leu | Pro | Ala | Ala | Ala | Gly | Ala | Ser | Val | | |
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| gct | aac | cca | ggg | gtc | aca | gtt | gtt | gat | att | gat | ggg | gat | ggg | agc | ttc | 1592 | |
| Ala | Asn | Pro | Gly | Val | Thr | Val | Val | Asp | Ile | Asp | Gly | Asp | Gly | Ser | Phe | | |
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| Val | Lys | Val | Met | Val | Leu | Asn | Asn | Gln | His | Leu | Gly | Met | Val | Val | Gln | | |
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| ttg | gag | gat | agg | ttt | tac | aag | gcg | aat | agg | gcg | cat | aca | tac | ttg | ggc | 1736 | |
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| Lys | Gly | Phe | Asn | Ile | Pro | Ala | Val | Arg | Val | Thr | Lys | Lys | Ser | Glu | Val | | |
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| Ser | Arg | Arg | Pro | Ile | Leu | Tyr | Val | Gly | Gly | Gly | Cys | Ser | Ala | Ser | Gly | | | | | | |
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| Asp | Glu | Leu | Arg | Trp | Phe | Val | Glu | Leu | Thr | Gly | Ile | Pro | Val | Thr | Thr | | | | | | |
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| Thr | Leu | Met | Gly | Leu | Gly | Asn | Phe | Pro | Ser | Asp | Asp | Pro | Leu | Ser | Leu | | | | | | |
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| Thr | Gly | Lys | Ile | Glu | Ala | Phe | Ala | Ser | Arg | Ala | Lys | Ile | Val | His | Ile | | | | | | |
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| Gln | Gln | Ser | Thr | Thr | Lys | Thr | Ser | Ser | Asp | Phe | Ser | Ala | Trp | His | Asn | | | | | | |
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| Glu | Leu | Asp | Gln | Gln | Lys | Arg | Glu | Phe | Pro | Leu | Gly | Tyr | Lys | Thr | Phe | | | | | | |
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| | | 435 | | | | | 440 | | | | | 445 | | | | | | | | | |
| Thr | Lys | Gly | Glu | Ala | Ile | Ile | Ala | Thr | Gly | Val | Gly | Gln | His | Gln | Met | | | | | | |
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| Trp | Ala | Ala | Gln | Tyr | Tyr | Thr | Tyr | Lys | Arg | Pro | Arg | Gln | Trp | Leu | Ser | | | | | | |

| | | | | | | |
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| Gly Ser Phe Leu Met Asn Ile Gln Glu Leu Ala Leu Ile Arg Ile Glu | | | | | | |
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| Tyr Leu Gly Asn Pro Glu Cys Glu Ser Glu Ile Tyr Pro Asp Phe Val | | | | | | |
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| Tyr Leu Leu Asp Ile Ile Val Pro His Gln Glu His Val Leu Pro Met | | | | | | |
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Arg Thr Val Tyr

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<220>
 <223> Description of Artificial Sequence: synthetic oligonucleotide primer

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21

<210> 10
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 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: synthetic oligonucleotide primer

<400> 10

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21

<210> 11

<211> 19

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: synthetic oligonucleotide primer

<400> 11

ctgggacacc tcgatgaat

19

<210> 12

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: synthetic oligonucleotide primer

<400> 12

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25

<210> 13

<211> 18

<212> DNA

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<220>

<223> Description of Artificial Sequence: synthetic oligonucleotide primer

<400> 13

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18

<210> 14

<211> 21

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<220>

<223> Description of Artificial Sequence: synthetic oligonucleotide primer

<400> 14

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21

<210> 15

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<220>

<223> Description of Artificial Sequence: synthetic oligonucleotide primer

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16

<210> 16

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<400> 16

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22

<210> 17

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<223> Description of Artificial Sequence: synthetic oligonucleotide primer

<400> 17

cagcgacgtg ttcgccta

18

<210> 18

<211> 18

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<223> Description of Artificial Sequence: synthetic oligonucleotide primer

<400> 18

ccaccgacat agagaatc

18

<210> 19

<211> 18

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<223> Description of Artificial Sequence: synthetic oligonucleotide primer

<400> 19

acacggactg caggaata

18

<210> 20

<211> 18

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<220>

<223> Description of Artificial Sequence: synthetic oligonucleotide primer

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18

<210> 21

<211> 17

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<223> Description of Artificial Sequence: synthetic oligonucleotide primer

<400> 21

gcatcttctt gatggcg

17

<210> 22

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<400> 22

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18

<210> 23

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<212> DNA

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<220>

<223> Description of Artificial Sequence: synthetic oligonucleotide primer

<400> 23

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17

<210> 24

<211> 17

<212> DNA

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<220>

<223> Description of Artificial Sequence: synthetic oligonucleotide primer

<400> 24

aggtgtcaca gttgttg

17

<210> 25
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 <400> 25
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 <210> 26
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 <223> Description of Artificial Sequence: synthetic oligonucleotide primer

 <400> 26
 gctttgccaa catacag 17

 <210> 27
 <211> 17
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 <213> Artificial Sequence

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 <223> Description of Artificial Sequence: synthetic oligonucleotide primer

 <400> 27
 cagcccaaatt cccattg 17

 <210> 28
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 <223> Description of Artificial Sequence: synthetic oligonucleotide primer

 <400> 28
 atgtaccctg gtagattc 18

 <210> 29
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19

<210> 31
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23

<210> 32
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<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: synthetic oligonucleotide primer

<400> 32
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23

<210> 33
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<220>
<223> Description of Artificial Sequence: synthetic oligonucleotide primer

<400> 33
ccccagccgc atgatcggca ccgacgcctt

30

<210> 34

<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: synthetic oligonucleotide primer

<400> 34
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<210> 35
<211> 1403
<212> DNA
<213> Nippon-bare

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gccgtgccgg tctgggacac ctcatgaat ctaccagggt acatcgcacg cctgcccgaag 180
ccaccgcga cagaattgct tgagcaggtc ttgctctgg ttggcgagtc acggcgcccg 240
attctctatg tcggtgggtg ctgctctgca tctggtgacg aattgcgctg gtttggtgag 300
ctgactggta tcccagttac aaccactctg atgggcctcg gcaatttccc cagtgcagac 360
ccgttgctcc tgcgcattgt tgggatgcat ggcacgggtg acgcaaatta tgccgtggat 420
aaggctgacc tgttgcttgc gtttggtgtg cggtttgatg atcgtgtgac agggaaaatt 480
gaggcttttg caagcagggc caagattgtg cacattgaca ttgatccagc agagattgga 540
aagaacaagc aaccacatgt gtcaatttgc gcagatgtta agcttgcttt acagggcttg 600
aatgctctgc tacaacagag cacaacaaag acaagttctg attttagtgc atggcacaat 660
gagttggacc agcagaagag ggagtttctt ctggggatga aaacttttgg tgaagagatc 720
ccaccgcaat atgccattca ggtgctggat gagctgacga aaggtagaggc aatcatcgct 780
actggtgttg ggcagcacca gatgtgggag gcacaatatt acacctacaa gcggccacgg 840
cagtggctgt cttcggtctg tctgggcgca atgggatttg ggctgcctgc tgcagctggc 900
gcttctgttg ctaaccagag tgtcacagtt gttgatattg atggggatgg tagcttcctc 960
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agggcgcata catacttggg caaccgggaa tgtgagagcg agatatatcc agattttgtg 1140
acctattgct aaggggttca atattcctgc agtccgtgta acaaagaaga gtgaagtccg 1200

| | |
|---|------|
| tgccgccatc aagaagatgc tcgagactcc agggccatac ttgttggata tcatcgtecc | 1260 |
| gcaccaggag catgtgctgc ctatgatccc aagtgggggc gcattcaagg acatgatcct | 1320 |
| ggatggtgat ggcaggactg tgtattaatc tataatctgt atgttggcaa agcaccagcc | 1380 |
| cggcctatgt ttgacctgaa tga | 1403 |

<210> 36
 <211> 1404
 <212> DNA
 <213> Maize

| | |
|--|------|
| <400> 36 | |
| catcgtcgag gtcacccgct ccatcaccaa gcacaactac ctggtcctcg acgtcgacga | 60 |
| catccccgc gtcgtgcagg aggccttctt cctcgcatcc tctggtcgcc cggggccggt | 120 |
| gcttgttgac atccccaaagg acatccagca gcagatggcg gtgccggcct gggacacgcc | 180 |
| catgagtctg cctgggtaca tcgcgcgcct tcccaagcct cccgcgactg aatttcttga | 240 |
| gcaggtgctg cgtcttggtg gtgaatcacg gcgcctgtt ctttatgttg gcggtggctg | 300 |
| tgcagcatca ggtgaggagt tgtgccgctt tgtggagttg actggaatcc cagtcacaac | 360 |
| tactcttatg ggccttgga acttccccag cgacgacca ctgtcactgc gcatgcttg | 420 |
| tatgcatggc acagtgtatg caaattatgc agtggataag gccgatctgt tgcttgcat | 480 |
| tggtgtgcgg tttgatgatc gtgtgacagg gaaaattgag gcttttgca gcagagctaa | 540 |
| gattgtgcac attgatattg atcctgctga gattggcaag aacaagcagc cacatgtgtc | 600 |
| catctgtgca gatgttaagc ttgctttgca gggcatgaat actcttctgg aaggaagcac | 660 |
| atcaaagaag agctttgact tcggctcatg gcatgatgaa ttggatcagc aaaagaggga | 720 |
| gtttccctt ggatataaaa tcttcaatga ggaaatccag ccacaatatg ctattcaggt | 780 |
| tcttgatgag ttgacgaagg gggaggccat cattgccaca ggtgttgggc agcaccagat | 840 |
| gtgggcggca cagtattaca cttacaagcg gccaaaggcag tggctgtctt cagctggtct | 900 |
| tggggctatg ggatttggtt tgccggctgc tgcgtgtgct gctgtggcca acccaggtgt | 960 |
| cactgttggt gacatcgacg gagatggtag cttcctcatg aacattcagg agctagctat | 1020 |
| gatccgtatt gagaacctcc cagtcaaggt ctttgtgcta aacaaccagc acctcgggat | 1080 |
| ggtggtgcag tgggaggaca ggttctataa ggccaataga gcacacacat tcttgggaaa | 1140 |
| cccagagaac gaaagtgaga tatatccaga ttttgtggca attgctaaag ggttcaacat | 1200 |
| tccagcagtc cgtgtgacaa agaagagcga agtccatgca gcaatcaaga agatgcttga | 1260 |

| | |
|---|------|
| ggctccaggg ccgtaacctct tggatataat cgtcccgcac caggagcatg tgttgccctat | 1320 |
| gatccctagt ggtggggcctt tcaaggatat gatcctggat ggtgatggca ggactgtgta | 1380 |
| ttgatccggt gactgcaggt cgac | 1404 |

<210> 37
 <211> 2279
 <212> DNA
 <213> Oryza sativa

| | |
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| <400> 37 | |
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| cgccctgtcc gccgcgcga cggccaagac cggccgtaag aaccaccagc gacaccacgt | 120 |
| ccttcccget cgaggccggg tgggggcggc ggcggtcagg tgctcggcg tgtccccggt | 180 |
| caccccgccc tccccggcgc cgcggccac gccgctccgg ccgtgggggc cggccgagcc | 240 |
| ccgcaagggc gcggacatcc tcgtggaggc gctggagcgg tcgggcgtca gcgacgtgtt | 300 |
| cgctacccg ggcggcgcgt ccatggagat ccaccaggcg ctgacgcgt ccccggtcat | 360 |
| caccaaccac ctcttcgcgc acgagcaggg cgaggcggtc gcggcgctcc ggtacgcgcg | 420 |
| cgcgtccggc cgcgtcgggg tctgcgtcgc cacctccggc cccggggcaa ccaacctcgt | 480 |
| gtccgcgctc gccgacgcgc tgctcgaact cgtcccgatg gtcgccatca cgggccaggt | 540 |
| ccccgcgcgc atgatcggca ccgacgcctt ccaggagacg cccatagtcg aggtcaccgc | 600 |
| ctccatcacc aagcacaatt accttgctct tgatgtggag gacatcccc gcgtcataca | 660 |
| ggaagccttc ttctcgcgt cctcgggccc tcttgcccc gtgctggtcg acatccccaa | 720 |
| ggacatccag cagcagatgg ccgtgccggt ctgggacacc tcgatgaatc taccagggtg | 780 |
| catcgcacgc ctgcccgaag caccgcgcac agaattgctt gagcaggtct tgcgtctggt | 840 |
| tggcgagtca cggcgcccga ttctctatgt cgggtggtggc tgctctgcat ctggtgacga | 900 |
| attgcgctgg tttgttgagc tgactggtat ccagttaca accactctga tgggcctcgg | 960 |
| caatttcccc agtgacgacc cgttgtccct gcgcctgctt gggatgcatg gcacggtgta | 1020 |
| cgcaaattat gccgtggata aggctgacct gttgcttgcg tttggtgtgc ggtttgatga | 1080 |
| tcgtgtgaca gggaaaattg aggcttttgc aagcagggcc aagattgtgc acattgacat | 1140 |
| tgatccagca gagattggaa agaacaagca accacatgtg tcaatttgcg cagatgttaa | 1200 |
| gcttgcttta cagggttga atgctctgct acaacagagc acaacaaaga caagttctga | 1260 |
| ttttagtgca tggcacaatg agttggacca gcagaagagg gagtttctc tggggtacaa | 1320 |

| | | | | | | |
|------------|------------|------------|------------|------------|-------------|------|
| aacttttggg | gaagagatcc | caccgcaata | tgccattcag | gtgctggatg | agctgacgaa | 1380 |
| aggtgaggca | atcatcgcta | ctggtgttgg | gcagcaccag | atgtgggcgg | cacaatatta | 1440 |
| cacctacaag | cggccacggc | agtggctgtc | ttcggtcgg | ctgggcgcaa | tgggatttgg | 1500 |
| gctgcctgct | gcagctggtg | cttctgtggc | taaccacagg | gtcacagttg | ttgatattga | 1560 |
| tggggatggg | agcttcctca | tgaacattca | ggagctggca | ttgatccgca | ttgagaacct | 1620 |
| cctgtgaag | gtgatggtgt | tgaacaacca | acatttgggt | atggtggtgc | aattggagga | 1680 |
| taggttttac | aaggcgaata | gggcgcatac | atacttgggc | aacccggaat | gtgagagcga | 1740 |
| gatatatcca | gattttgtga | ctattgctaa | ggggttcaat | attcctgcag | tccgtgtaac | 1800 |
| aaagaagagt | gaagtccgtg | ccgccatcaa | gaagatgctc | gagactccag | ggccatactt | 1860 |
| gttggatatc | atcgccccgc | accaggagca | tgtgctgcct | atgatcccaa | ttgggggcgc | 1920 |
| attcaaggac | atgatcctgg | atggtgatgg | caggactgtg | tattaatcta | taatctgtat | 1980 |
| gttggcaaag | caccagcccc | gcctatgttt | gacctgaatg | acccataaag | agtggatatgc | 2040 |
| ctatgatggt | tgtatgtgct | ctatcaataa | ctaagggtgc | aactatgaac | catatgctct | 2100 |
| tctgttttac | ttgtttgatg | tgtttggcat | ggtaatccta | attagcttcc | tgtgtcttag | 2160 |
| gtttgtagtg | tgttgttttc | tgtaggcata | tgcatacaca | gatatcatgt | aagtttcttg | 2220 |
| tcctacatat | caataataag | agaataaagt | acttctatgt | aaaaaaaaaa | aaaaaaaaaa | 2279 |

<210> 38
 <211> 2301
 <212> DNA
 <213> *Oryza sativa*

| | |
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| <400> 38 | |
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| ccgcggccgc | 120 |
| accagcgaca | 180 |
| cggcgggtgtc | 240 |
| gggggcgggc | 300 |
| gcgtcagcga | 360 |
| cgcgctcccc | 420 |
| cgctccgggt | 480 |
| gggcaaccaa | 540 |

| | | | | | | |
|-------------|-------------|-------------|------------|------------|-------------|------|
| ccatcacggg | ccaggtcccc | cgccgcatga | tcggcaccga | cgccttccag | gagacgccc | 600 |
| tagtcgaggt | cacccgctcc | atcaccaagc | acaattacct | tgtccttgat | gtggaggaca | 660 |
| tccccgcgt | catacaggaa | gccttcttcc | tcgcgtcctc | gggccgtcct | ggccccggtgc | 720 |
| tggtcgacat | ccccaaaggac | atccagcagc | agatggccgt | gccggtctgg | gacacctcga | 780 |
| tgaatctacc | agggtagatc | gcacgcctgc | ccaagccacc | cgcgacagaa | ttgcttgagc | 840 |
| aggtcttgcg | tctgggtggc | gagtcacggc | gcccgattct | ctatgtcggg | ggtggctgct | 900 |
| ctgcatctgg | tgacgaattg | cgctggtttg | ttgagctgac | tggtatccca | gttacaacca | 960 |
| ctctgatggg | cctcggcaat | ttccccagtg | acgacccgtt | gtccctgcgc | atgcttggga | 1020 |
| tgcattggac | gggtgtacga | aattatgccg | tggataaggc | tgacctgttg | cttgcgtttg | 1080 |
| gtgtgcgggt | tgatgatcgt | gtgacagggg | aaattgaggc | ttttgcaagc | agggccaaga | 1140 |
| ttgtgcacat | tgacattgat | ccagcagaga | ttggaaagaa | caagcaacca | catgtgtcaa | 1200 |
| tttgccgaga | tgtaagctt | gctttacagg | gcttgaatgc | tctgctacaa | cagagcacia | 1260 |
| caaagacaag | ttctgatttt | agtgcattgg | acaatgagtt | ggaccagcag | aagagggagt | 1320 |
| ttcctctggg | gtacaaaact | tttgggtgaag | agatcccacc | gcaatatgcc | attcaggtgc | 1380 |
| tggatgagct | gacgaaaggt | gaggcaatca | tcgctactgg | tggtgggcag | caccagatgt | 1440 |
| gggcggcaca | atattacacc | tacaagcggc | cacggcagtg | gctgtcttcg | gctggctctgg | 1500 |
| gcgcaatggg | atttgggctg | cctgctgcag | ctgggtgctt | tgtgggtaac | ccaggtgtca | 1560 |
| cagttgttga | tattgatggg | gatggtagct | tcctcatgaa | cattcaggag | ctggcattga | 1620 |
| tccgcattga | gaacctccct | gtgaagggtga | tgggtgttga | caaccaacat | ttgggtatgg | 1680 |
| tgggtgcaatg | ggaggatagg | ttttacaagg | cgaatagggc | gcatacatc | ttgggcaacc | 1740 |
| cggaatgtga | gagcgagata | tatccagatt | ttgtgactat | tgctaagggg | ttcaatatcc | 1800 |
| ctgcagtccg | tgtaacaaaag | aagagtgaag | tccgtgccgc | catcaagaag | atgctcgaga | 1860 |
| ctccagggcc | atacttgttg | gatatcatcg | tcccgacca | ggagcatgtg | ctgcctatga | 1920 |
| tcccaagtgg | gggcgcattc | aaggacatga | tcctggatgg | tgatggcagg | actgtgtatt | 1980 |
| aatctataat | ctgtatgttg | gcaaagcacc | agcccgccct | atgtttgacc | tgaatgaccc | 2040 |
| ataaagagtg | gtatgcctat | gatgtttgtg | tgtgctctat | caataactaa | ggtgtcaact | 2100 |
| atgaaccata | tgctcttctg | ttttacttgt | ttgatgtgct | tggcatggta | atcctaatta | 2160 |
| gcttctgct | gtctaggttt | gtagtgtgtt | gttttctgta | ggcatatgca | tcacaagata | 2220 |
| tcattgtaagt | ttcttgcct | acatatcaat | aataagagaa | taaagtactt | ctatgcaaaa | 2280 |

aaaaaaaaa aaaaaaaaaa a

2301

<210> 39

<211> 644

<212> PRT

<213> Oryza sativa

<400> 39

| | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Met | Ala | Thr | Thr | Ala | Ala | Ala | Ala | Ala | Ala | Ala | Ala | Leu | Ser | Ala | Ala | Ala | |
| 1 | | | | 5 | | | | | 10 | | | | | | 15 | | |
| Thr | Ala | Lys | Thr | Gly | Arg | Lys | Asn | His | Gln | Arg | His | His | Val | Leu | Pro | | |
| | | | 20 | | | | | 25 | | | | | 30 | | | | |
| Ala | Arg | Gly | Arg | Val | Gly | Ala | Ala | Ala | Val | Arg | Cys | Ser | Ala | Val | Ser | | |
| | | 35 | | | | | 40 | | | | | 45 | | | | | |
| Pro | Val | Thr | Pro | Pro | Ser | Pro | Ala | Pro | Pro | Ala | Thr | Pro | Leu | Arg | Pro | | |
| | 50 | | | | | 55 | | | | | 60 | | | | | | |
| Trp | Gly | Pro | Ala | Glu | Pro | Arg | Lys | Gly | Ala | Asp | Ile | Leu | Val | Glu | Ala | | |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 | | |
| Leu | Glu | Arg | Cys | Gly | Val | Ser | Asp | Val | Phe | Ala | Tyr | Pro | Gly | Gly | Ala | | |
| | | | | 85 | | | | | 90 | | | | | | 95 | | |
| Ser | Met | Glu | Ile | His | Gln | Ala | Leu | Thr | Arg | Ser | Pro | Val | Ile | Thr | Asn | | |
| | | | 100 | | | | | 105 | | | | | 110 | | | | |
| His | Leu | Phe | Arg | His | Glu | Gln | Gly | Glu | Ala | Phe | Ala | Ala | Ser | Gly | Tyr | | |
| | | 115 | | | | | 120 | | | | | 125 | | | | | |
| Ala | Arg | Ala | Ser | Gly | Arg | Val | Gly | Val | Cys | Val | Ala | Thr | Ser | Gly | Pro | | |
| | 130 | | | | | 135 | | | | | 140 | | | | | | |
| Gly | Ala | Thr | Asn | Leu | Val | Ser | Ala | Leu | Ala | Asp | Ala | Leu | Leu | Asp | Ser | | |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 | | |
| Val | Pro | Met | Val | Ala | Ile | Thr | Gly | Gln | Val | Pro | Arg | Arg | Met | Ile | Gly | | |
| | | | 165 | | | | | | 170 | | | | | 175 | | | |
| Thr | Asp | Ala | Phe | Gln | Glu | Thr | Pro | Ile | Val | Glu | Val | Thr | Arg | Ser | Ile | | |
| | | 180 | | | | | | 185 | | | | | 190 | | | | |
| Thr | Lys | His | Asn | Tyr | Leu | Val | Leu | Asp | Val | Glu | Asp | Ile | Pro | Arg | Val | | |
| | | 195 | | | | | 200 | | | | | 205 | | | | | |
| Ile | Gln | Glu | Ala | Phe | Phe | Leu | Ala | Ser | Ser | Gly | Arg | Pro | Gly | Pro | Val | | |
| | 210 | | | | | 215 | | | | | 220 | | | | | | |
| Leu | Val | Asp | Ile | Pro | Lys | Asp | Ile | Gln | Gln | Gln | Met | Ala | Val | Pro | Val | | |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 | | |
| Trp | Asp | Thr | Ser | Met | Asn | Leu | Pro | Gly | Tyr | Ile | Ala | Arg | Leu | Pro | Lys | | |
| | | | | 245 | | | | | 250 | | | | | 255 | | | |

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Pro | Pro | Ala | Thr | Glu | Leu | Leu | Glu | Gln | Val | Leu | Arg | Leu | Val | Gly | Glu | 260 | 265 | 270 |
| Ser | Arg | Arg | Pro | Ile | Leu | Tyr | Val | Gly | Gly | Gly | Cys | Ser | Ala | Ser | Gly | 275 | 280 | 285 |
| Asp | Glu | Leu | Arg | Trp | Phe | Val | Glu | Leu | Thr | Gly | Ile | Pro | Val | Thr | Thr | 290 | 295 | 300 |
| Thr | Leu | Met | Gly | Leu | Gly | Asn | Phe | Pro | Ser | Asp | Asp | Pro | Leu | Ser | Leu | 305 | 310 | 315 |
| Arg | Met | Leu | Gly | Met | His | Gly | Thr | Val | Tyr | Ala | Asn | Tyr | Ala | Val | Asp | 325 | 330 | 335 |
| Lys | Ala | Asp | Leu | Leu | Leu | Ala | Phe | Gly | Val | Arg | Phe | Asp | Asp | Arg | Val | 340 | 345 | 350 |
| Thr | Gly | Lys | Ile | Glu | Ala | Phe | Ala | Ser | Arg | Ala | Lys | Ile | Val | His | Ile | 355 | 360 | 365 |
| Asp | Ile | Asp | Pro | Ala | Glu | Ile | Gly | Lys | Asn | Lys | Gln | Pro | His | Val | Ser | 370 | 375 | 380 |
| Ile | Cys | Ala | Asp | Val | Lys | Leu | Ala | Leu | Gln | Gly | Leu | Asn | Ala | Leu | Leu | 385 | 390 | 395 |
| Gln | Gln | Ser | Thr | Thr | Lys | Thr | Ser | Ser | Asp | Phe | Ser | Ala | Trp | His | Asn | 405 | 410 | 415 |
| Glu | Leu | Asp | Gln | Gln | Lys | Arg | Glu | Phe | Pro | Leu | Gly | Tyr | Lys | Thr | Phe | 420 | 425 | 430 |
| Gly | Glu | Glu | Ile | Pro | Pro | Gln | Tyr | Ala | Ile | Gln | Val | Leu | Asp | Glu | Leu | 435 | 440 | 445 |
| Thr | Lys | Gly | Glu | Ala | Ile | Ile | Ala | Thr | Gly | Val | Gly | Gln | His | Gln | Met | 450 | 455 | 460 |
| Trp | Ala | Ala | Gln | Tyr | Tyr | Thr | Tyr | Lys | Arg | Pro | Arg | Gln | Trp | Leu | Ser | 465 | 470 | 475 |
| Ser | Ala | Gly | Leu | Gly | Ala | Met | Gly | Phe | Gly | Leu | Pro | Ala | Ala | Ala | Gly | 485 | 490 | 495 |
| Ala | Ser | Val | Ala | Asn | Pro | Gly | Val | Thr | Val | Val | Asp | Ile | Asp | Gly | Asp | 500 | 505 | 510 |
| Gly | Ser | Phe | Leu | Met | Asn | Ile | Gln | Glu | Leu | Ala | Leu | Ile | Arg | Ile | Glu | 515 | 520 | 525 |
| Asn | Leu | Pro | Val | Lys | Val | Met | Val | Leu | Asn | Asn | Gln | His | Leu | Gly | Met | 530 | 535 | 540 |
| Val | Val | Gln | Trp | Glu | Asp | Arg | Phe | Tyr | Lys | Ala | Asn | Arg | Ala | His | Thr | 545 | 550 | 555 |
| | | | | | | | | | | | | | | | | | | 560 |

Tyr Leu Gly Asn Pro Glu Cys Glu Ser Glu Ile Tyr Pro Asp Phe Val
565 570 575

Thr Ile Ala Lys Gly Phe Asn Ile Pro Ala Val Arg Val Thr Lys Lys
580 585 590

Ser Glu Val Arg Ala Ala Ile Lys Lys Met Leu Glu Thr Pro Gly Pro
595 600 605

Tyr Leu Leu Asp Ile Ile Val Pro His Gln Glu His Val Leu Pro Met
610 615 620

Ile Pro Ser Gly Gly Ala Phe Lys Asp Met Ile Leu Asp Gly Asp Gly
625 630 635 640

Arg Thr Val Tyr